

Global Warming Can Change the Appearance of Species Ecological Niches and Drive the Evolution of Climatic Niche Specialization

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Editorial

Species use restricted ecological niches, the role and position a species has in its environment. In other words, the ecological niche describes how a species responds to the distribution of resources and competitors and how it alters those factors. All species have segregated niches, due to the use of different geographic areas, seasons, habitats, and food resources. Several studies indicate that ecological niches and species' distributions result from interacting ecological and evolutionary factors, such as biotic and abiotic restrictions, dispersal limitation, interspecific competition, and local adaptation. Niche evolution can differ as a function of the spatial scale of environmental variation and hence, can control biodiversity from ecological to evolutionary time scales [1,2]. Therefore, the causes of niche restriction and segregation are important problems in "evolutionary ecology", which mostly considers how interactions among and/or between species and their physical environment shape species through adaptation and selection, and the consequences of the resulting evolutionary change.

Habitat as a type of natural environment in which a particular species lives, can find food, shelter, protection and mates for reproduction, is characterized by biological and physical features. It may change over time due to several events such as the eruption of a volcano, an earthquake, a change in oceanic currents, or even gradual changes for example alterations in the climate and weather patterns, precipitation, solar radiation and so on. Consequently, every habitat includes large numbers of microhabitats which is the small-scale physical requirements of a particular species, with subtly different exposure to air movement, light, temperature, humidity, and other factors. Global warming, climate change, habitat alterations at landscape level, along with a number of indirect effects on the life of animals through the land-use changes implemented by human activities (such as deforestation, agriculture, forestry and fishery, ploughing of ancient grasslands, draining of marshland and the dredging of the seabed, diversion and damming of rivers) are considered as major driving forces of niche segregation and biodiversity loss all over the world [3]. For example, fluctuation in

rodent's populations can occur due to changes in climate (temperature, rainfall, and relative humidity), feeding resources, and habitat structure [4]. On the other hand, one of the major problems for the control and understanding of infection rate of zoonotic diseases is the lack of information about the dynamics of their reservoir hosts populations. Therefore, accurate determination of the distribution pattern of reservoir host species such as rodents and those factors can effect on their niche segregation is important in epidemiology and control of rodent borne pathogens [5].

Loss of habitat and changes in microhabitats are considered as important threat to any species. Hence, the protection of habitats is of great concern in the maintenance of wildlife biodiversity. Habitat fragmentation and emergence of discontinuities in species preferred habitat, resulted in population fragmentation and ecosystem decay. It can be one of the major causes of speciation due to events such as migration and genetic drift, or can cause extinctions of many species as a result of altering the environment much faster. All in all, there is still a need to investigate the effects of climate changes on spatial distribution pattern and habitat selection for a better understanding of evolutionary processes in different species and to offer valuable insight into which of these processes are more prevalent in shaping species' distributions.

References

1. Holt RD (2009) Bringing the hutchinsonian niche into the 21st century: Ecological and evolutionary perspectives. *PNAS* 106: 19659-19665.
2. Cicero C (2004) Barriers to sympatry between avian sibling species (Paridae: Baeolophus) in local secondary contact. *Evolution* 58: 1573-1587.
3. Ruiz-Labourdette D, Nogués-Bravo D, Ollero HS, Schmitz MF, Pineda FD (2012) Forest composition in Mediterranean mountains is projected to shift along the entire elevational gradient under climate change. *J Biogeogr* 39: 162-176.
4. Ari TB, Neerincx S, Gage KL, Kreppel K, LaDiso A, et al. (2011) Plague and climate: scales matter. *PLoS Pathog* 7: e1002160.
5. Meerburg BG, Singleton GR, Kijlstra A (2009) Rodent-borne diseases and their risks for public health. *Crit Rev Microbiol* 35: 221-270.